

2.5 Electron Impact Emission Cross Sections for Modeling UV Auroral and Dayglow Observations of the Upper Atmospheres of the Planets

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In the upper atmospheres of the Jovian and Terrestrial planets a dominant mechanism for energy transfer occurs through electron **collisional** processes with neutral species leading to UV radiation. In response to the need for accurate collision cross sections to model spectroscopic observations of planetary systems, JPL has measured in the laboratory emission cross sections and medium resolution spectra ($\lambda/\Delta\lambda = 10,000$) of H, H₂, N₂, SO₂ and other important planetary gases. Voyager and International Ultraviolet Explorer (IUE) spacecraft have established that band systems of H₂ and N₂ are the dominant UV molecular emissions in the solar system produced by electron impact. The threshold energy cross section behavior (0- 100 eV) and spectra of H₂ and N₂ are complex because of configuration interaction among states. Resonance excitation, predissociation and **non-Franck-Condon** band intensities systems are a consequence of configuration interaction. Applications of our data to models of Voyager, IUE, Galileo and **Hubble** Space Telescope observations of the planets will be described.

Session number is 2.5 Division II **Aeronomic** Phenomena Aeronomy of Aurora and **Airglow** Emissions and Laboratory measurements

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